NAVSEA
STANDARD ITEM

FY-05

ITEM NO: 009-48
DATE: 29 AUG 2003
CATEGORY: II

1. SCOPE:

1.1 Title: Pressure Seal Bonnet Valve; repair (shop)

2. REFERENCES:

2.1 T9074-AS-GIB-010/271, Requirements for Nondestructive Testing Methods

2.2 MIL-STD-2035, Nondestructive Testing Acceptance Criteria

2.3 803-5001021, Pressure Seal Rings Standard and Oversize Valve Pressure Class 600-1500

2.4 S9253-AD-MMM-010, Volume 1, Maintenance Manual for Valves, Traps, and Orifices (Non-Nuclear), User's Guide and General Information

3. REQUIREMENTS:

3.1 Matchmark valve parts.

(V) "INSPECT PARTS FOR DEFECTS"

3.2 Disassemble, clean internal and external surfaces free of foreign matter (including paint), and inspect parts for defects.

(I) "LIQUID PENETRANT INSPECT"

3.2.1 Accomplish liquid penetrant inspection of seats (including back seat), discs, or gate and body inlay area in accordance with 2.1.

3.2.1.1 Acceptance criteria shall be in accordance with Section 7 of 2.2, except hairline cracks in hard-faced areas of seats and discs or gate are acceptable provided the valve does not show evidence of leakage.

3.3 Repair valve as follows:

3.3.1 Straighten stem to within 0.002 inch total indicator reading. Polish stem to a 32 Root-Mean-Square (RMS) finish in way of packing surface and remove raised edges and foreign matter.

3.3.2 Chase and tap exposed threaded areas.

3.3.3 Dress and true gasket mating surfaces.

3.3.4 Inspect and repair sealing surfaces of pressure seal ring as follows:

(V) "VISUAL INSPECT"

3.3.4.1 Inspect valve body to verify that stainless steel inlay is free of steam cuts and cracks and diameter of inlay area is round to within 0.003 inch and free of non-design taper. Measure diameter at top and bottom of inlay area in increments of 45 degrees, on each circle.

3.3.4.2 Correct out-of-round, non-design tapered condition and provide 32 RMS finish. Finished diameter shall provide 0.002 to 0.005 inch clearance on the standard size diameter for seal rings described by 2.3.

3.3.4.3 Machine valve bonnet tapered area for concentricity and design angle to within 0.002 inch total indicator reading and 32 RMS finish.

3.3.5 Machine, grind, or lap and spot-in discs or gate to seats (including back seat) to obtain a 360-degree continuous contact.

(V) "INSPECT CONTACT"

3.3.5.1 Inspect contact using blueing method.

3.3.5.2 Transfer line for gate valve shall not exceed 3/16 inch in width and shall appear within the lower 75 percent of the gate seating surface.

3.3.5.3 Transfer line for globe valve shall not exceed 1/16 inch in width.

(I)(G) "VERIFY LEVEL I PARTS" (See 4.3)

3.4 Assemble valve installing new fasteners in accordance with Table One.

3.4.1 Install new seal ring in accordance with 2.3.

3.4.1.1 Attach a metal identification tag to the valve bonnet indicating the size of seal ring installed, straight or tapered body neck, name of installing activity, and date of installation.

3.4.2 Install new valve stem packing conforming to MIL-P-24503/24583 combination in accordance with Chapter 6 of 2.4.

3.5 Hydrostatically test valve as follows:

3.5.1 Hydrostatic test equipment shall have the following capabilities:

3.5.1.1 Manual overpressure protection release valve.

3.5.1.2 Self-actuated and resetting relief valve with a set point no greater than 100 PSIG above the test pressure or 10 percent above the test pressure, whichever is less.

3.5.1.3 Master and backup test gages with gage range and graduation shown on Table 2.

3.5.1.4 Protection equipment shall be accessible and test gages shall be located where clearly visible and readable to pump operator and inspector.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.4)

3.5.2 Test gate valve alternately on each side of gate with opposite side open for inspection.

(V)(G) or (I)(G) "SEAT TIGHTNESS" (See 4.4)

3.5.3 Test globe valve in the direction tending to open valve.

3.5.4 Do not exceed the handwheel closing force specified in Table 3.

3.5.5 Test shall be continued for a minimum of three minutes if there is no evidence of leakage, or in the event of visible leakage, until accurate determination of leakage can be made. Maximum allowable leakage: 10 cubic centimeters (cc) per hour, per inch of nominal pipe size. Valve sizes of one inch or less may be 10 cc maximum per hour.

4. NOTES:

4.1 The test pressures of 3.5.2 and 3.5.3 will be specified in Work Item.

4.2 Repair of valve operating gear will be specified in Work Item.

4.3 The paragraph referencing this note is considered an (I)(G) if the valve is Level I.

4.4 The paragraph referencing this note is considered an (I)(G) if the valve is Level I. If the valve is not Level I, the paragraph is considered a (V)(G).

TABLE ONE

VALVE BODY MATERIAL

| | 1/ Alloy Steel | Carbon Steel | 2/ Nonferrous |
|---|---|---|---|
| 3/ Studs and Bolts to MIL-DTL-1222 | Grade B-16 | Grade B-16 | Phosphor Bronze - Any Grade<br>Silicon Bronze - Any Grade<br>Nickel Copper - Class A 4/ |
| Nuts to MIL-DTL-1222 | Grade 4 or 7 | Grade 4 or 7 | Phosphor Bronze - Any Grade<br>Silicon Bronze - Any Grade<br>Nickel Copper - Class A or Class B 5/ |
| Socket Head Cap Screws | FF-S-86 | FF-S-86 | |

1/ Alloy steel is of Composition A - 2-1/4 percent Chromium, one percent Molybdenum, Composition B - 1-1/4 percent Chromium, 1/2 percent Molybdenum, and Composition C - Carbon Molybdenum.

2/ Nonferrous Alloy except Aluminum.

3/ Studs shall be Class 2 or 3 fit on the nut end and Class 5 fit on the stud end, except that a Class 3 fit with a thread locking compound may be used where temperatures do not exceed 250 degrees Fahrenheit. The thread locking compound shall conform to MIL-S-22473. Check Class 3 fit stud ends in accordance with SAE-J2270.

4/ Fasteners of Nickel Copper Aluminum shall be the only type used on sea chest and hull valves.

5/ Nuts of Nickel Copper alloy conforming to QQ-N-281 Class A or B, or Nickel Copper Aluminum conforming to QQ-N-286 shall be the only type used on sea chest and hull valves.

TABLE 2 - MASTER GAGE SELECTION FOR HYDROSTATIC TESTS

| Maximum Test Pressure ($lb/in^2g$) | | Master Gage Range ($lb/in^2g$)*** | | Master Gage Maximum Graduation Size ($lb/in^2g$) |
|---|---|---|---|---|
| From* | To** | From | To | |
| 5000 | 9500 | 0 | 10000 | 100 |
| 3000 | 5800 | 0 | 6000 | 30 |
| 2500 | 4800 | 0 | 5000 | 30 |
| 1500 | 2800 | 0 | 3000 | 20 |
| 1000 | 1800 | 0 | 2000 | 15 |
| 750 | 1300 | 0 | 1500 | 10 |
| 500 | 800 | 0 | 1000 | 10 |
| 250 | 500 | 0 | 600 | 5 |
| 150 | 250 | 0 | 300 | 2 |
| 100 | 175 | 0 | 200 | 2 |
| 75 | 125 | 0 | 160 | 1 |
| 50 | 80 | 0 | 100 | 1 |
| 20 | 50 | 0 | 60 | 0.5 |
| 10 | 25 | 0 | 30 | 0.2 |
| 7 | 10 | 0 | 15 | 0.1 |
| 5 | 7 | 0 | 10 | 0.1 |

NOTES:

1. Master gage and back-up gages shall track within two percent of each other.

2. System maximum test pressures shall be determined by applicable overhaul specification, building specification, or other governing documents.

* Values agree with the requirement that gage range shall not exceed 200 percent of maximum test pressure except for gage ranges 0 to 60 and below.

** Values allow for reading pressures up to relief valve setting.

*** Exceptions to the values given in this table may be approved locally by Design, based on an evaluation of test pressure, gage range, and specific application.

TABLE 3

HANDWHEEL CLOSING FORCE

| Total Tangential Force Handwheel Diameter (Inches) | Total Torque on Rim of Handwheel (Pounds) | on Handwheel Nut (Foot Pounds) |
|---|---|---|
| 2 and below | 90 | ***7.5*** |
| 3 | 98 | 12 |
| 4 | 106 | ***18*** |
| 5 | 112 | 23 |
| 6 | 118 | 29 |
| 7 | 121 | 35 |
| 8 | 124 | 41 |
| 9 | 127 | ***48*** |
| 10 | 130 | 54 |
| 11 | 133 | 60 |
| 12 | 135 | ***68*** |
| 14 | 138 | ***81*** |
| 16 | 141 | 94 |
| 18 | 144 | 108 |
| 21 | 147 | 128 |
| 24 | 150 | 150 |
| 27 | 150 | ***169*** |
| 30 | 150 | ***188*** |
| 36 | 150 | 225 |